

ABSTRACT

A system and a method using image processing and pattern recognition techniques to substantially automatically analyze a captured image in order to accurately estimate a variety of microscopical properties of a prepared sample of a material in accordance with an established standard. Where the material is Portland cement concrete and the standard is ASTM C457-90, the analysis is operable to calculate estimates of sixteen characteristics to detect voids in the concrete, while discriminating against other components and features of the concrete. The preferred system broadly comprises a microscope; a high-precision stage; an image capturing mechanism; and a computing device. Analysis techniques applied to the image include color segmentation and recognition; shape feature segmentation and analysis; and intensity profile segmentation and recognition; the results of which are integrated to provide a final result wherefrom quality of the material may be determined.